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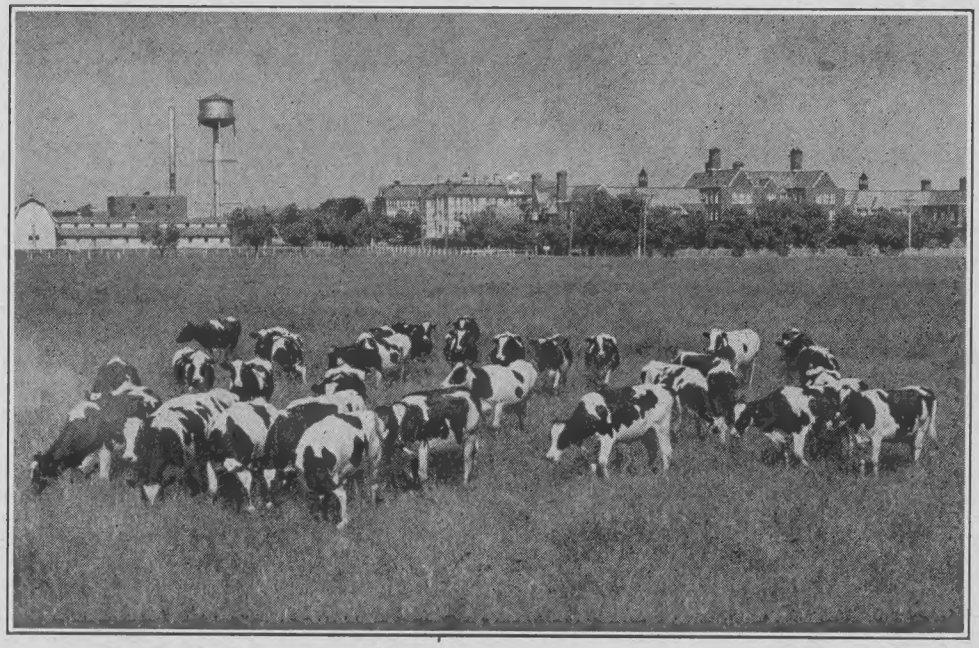
Feeding and Management of Dairy Cows



Abundance of well balanced, palatable feed, peace and comfort—essential elements for highest production.

by

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Feeding and Management of Dairy Cows

Efficiency of dairy cows, of which life-time volume of milk production is the measure, is determined by two factors—heredity and environment. These are complementary factors. Even as a chain is no stronger than its weakest link, so an excellent environment (feed and management) will not compensate for a poor milk inheritance, and neither can a cow achieve the limit of her inherited productive capacity denied adequate feed and care.

Improvement of the milking inheritance can be accomplished only by selective breeding which involves the mating of good and progressively better bulls with selected cows. Persistency and the skill with which selective breeding is conducted determine the rate of improvement, and since it is closely associated with cost of production, improvement by selection is something no dairyman can afford to neglect. Nevertheless, it is a notorious fact that many dairy cows, probably a majority, do not produce to the limit of their inherited capacities, and this by reason of the fact that they are not fed and managed in a manner enabling them to do so.

It is the purpose of this publication to set forth acceptable, proven, and in fact, time-honored methods of feeding and management insofar as these are suited to Manitoba conditions.

Preparation for Lactation

Milk yield is influenced to quite an extent by condition of cows at calving. The foetus (unborn calf) makes its most rapid growth during the last two months of the gestation period, hence the cow's maintenance requirement is higher at this time. Also, it is during the dry period that rapid storage in the body of lime and phosphorous takes place, so restoring to normal the reserve which is invariably greatly reduced during the first five months of lactation.

The dry period, therefore, which should be at least of eight weeks' duration, is obviously the time to fortify the system against the period of greatest strain. It is quite erroneous to suppose that liberal feeding of dry cows is wasteful. Feed fed to good dairy cows is never wasted because that which is not currently used for productive purposes is stored in the body, and this store, if not drawn on in one lactation, will certainly be exhausted in the next. The "fitting" ration need not be expensive because only a minimum of protein is required, and this can be supplied by the farm-grown feeds, oats, barley, and feed wheat. Immediately preceding and following calving there may be considerable congestion in the udder, hence bran, because of its laxative properties, should be the sole concentrate fed until congestion subsides.

Winter Feeding of Cows in Milk

Some fundamental considerations in feeding for milk production are as follows:

1. An abundant supply of good roughage (hay and silage) is the basis of profitable winter milk production. It furnishes nutrients at lowest cost. It is the natural food of the herbivorous cow and probably for this reason a short supply cannot be quite compensated for by heavy grain feeding. Legume hay (alfalfa and clover) is the roughage par excellence for milk production, but, in general, any forage crop cut in the not-too-mature stage of growth and cured with a minimum of exposure to weather, is suitable.

2. Cows vary greatly in roughage consumptive capacity but the majority of milking cows cannot consume enough roughage alone to satisfy their need for digestible nutrients, hence concentrates (i.e. grain and mill by-products) must be allowed.

3. Cows in milk have a large water requirement—12 gallons upwards daily—depending on level of production, nature of feed and atmospheric temperature. Best results are obtained by allowing water at will, but lacking such facilities, frequency and regularity of watering are of prime importance.

Roughage Feeds and Feeding

Since normally roughage furnishes nutrients at lowest cost it is economic practice to feed it to the limit of consumption. Inevitably on every farm a portion of the roughage is coarse, weathered and relatively unpalatable. Completeness of utilization of such depends on rendering it more palatable, which in turn involves cutting and mixing with well-liked feeds such as silage or diluted molasses. Feeding value of the hays depends much more on the stage of cutting and conditions surrounding the curing process than on the species of forage plants. Other things being equal, however, the legumes (alfalfa and clovers) have a higher value for milk production than the grasses. Legume hay has almost double the protein content of grass hays and is also significantly higher in lime and phosphorus.

Annual hay crops commonly grown include oats, corn, millet and some sorghums. Grain hays are of highest nutrient content when cut in the early dough stage. Wild hays vary widely in chemical composition, depending on species, stage at cutting, and rapidity of curing. Slough hay because of its low content of digestible nutrients is quite unsuitable for milk production.

Grain Feeds and Feeding

Grain, which includes the mill by-products, is properly regarded as a supplement to roughage. High quality roughage alone will support a relatively high level of production in the case of some cows but, in general, it is good economic practice to allow some grain to cows in milk. There are here two considerations involved:

1. Amount of grain to feed.

2. Protein content of the grain mixture. The grain allowance is primarily determined by the amount of milk produced and, to a lesser extent, by the milk butter fat content. It follows that one cannot feed intelligently and economically lacking day-to-day knowledge of the individual cow's production. Milk recording (weighing and testing) is therefore an essential feature of an efficient dairy production enterprise.

GRAIN FEEDING CHART

For Cows Producing Milk Testing About 3.8%

Daily Milk Production Pounds	Limited Feeding Pounds Grain Mixture	Liberal Feeding Pounds Grain Mixture	Daily Milk Production Pounds	Limited Feeding Pounds Grain Mixture	Liberal Feeding Pounds Grain Mixture
10	.....	.....	43	10	14
13	.....	2	46	11	15
16	.....	3	49	12½	16
19	.....	4	52	14	17½
22	2	5½	55	15	19
25	3	6½	58	16	20½
28	4	7½	61	17½	22
31	5½	9	64	19	23
34	6½	10	67	20½	24½
37	7½	11	70	22	24½
40	9	12½			

The circumstances which determine practice of "limited" or "liberal" feeding are these:

Feed the limited quantity when—

(a) the price of grain is high in relation to the price of butter fat.

(b) when cows are on pasture.

(c) when roughage is of top quality. Liberal feeding should be practiced when the reverse of these conditions prevails, and also when the milk tests significantly higher (4% and over).

Equally as important as the quantity of feed is the quality thereof, and it is the protein content that determines largely the quality. Milk is relatively high in protein, therefore the larger the milk production the larger must be the intake of feed protein; either that or the cow is forced to draw on her body tissues for the additional protein required, and, of course, the limit to such is soon reached. Protein, however, is the costly constituent of feeds because the farm-grown grains are relatively low in this nutrient and the purchased higher protein feeds (linseed oil meal, meat meal, bran, etc.) involve a cash outlay. It is because of this that legume hays have been referred to often as "the sheet anchor of successful dairying". Good legume hay with the farm grains alone will support moderately high milk production, but the low grade roughages require supplementation with grain fortified to some extent with a purchased protein concentrate.

The farm grains, including recleaned screenings, because of similarity in nutrient content are largely interchangeable in the ration. They differ, however, in physical characteristics. Oats by reason of the heavy hull are much higher in crude fiber than the other standard grains. They are, therefore, bulkier and have long been regarded as the "safe" feed for cattle and horses. Wheat by contrast is a "close" feed and when constituting a preponderant part of the grain mix is more likely to cause digestive disturbance. A good rule in this connection is that wheat, rye, recleaned screenings and barley, singly or in combination, should not constitute more than half of the grain mix.

Based on the foregoing comments on roughages and concentrates, following are suggested suitable grain mixtures.

A. Supplements to all-grass or cereal roughage:

17% PROTEIN (Approx.) MIXTURES

	Table 1 lbs.	Table 2 lbs.	Table 3 lbs.	Table 4 lbs.
Oats	585	725	625	550
Barley	.....	.....	.....	170
Wheat	.....	.....	100	.....
Wheat Screenings	240	.....	.....	.....
Wheat Bran	.....	100	.....	100
Shorts	.....	.....	100	.....
Linseed Oil Meal	175	175	175	180

B. Supplements to roughage, approximately one-third legume (alfalfa or sweet clover) and two-thirds grass:

14% PROTEIN (Approx.) MIXTURES

	Table 5 lbs.	Table 6 lbs.	Table 7 lbs.	Table 8 lbs.	Table 9 lbs.
Oats	560	900	660	650	785
Barley	280	.....	190	190	.....
Wheat	.....	.....	.....	.....	215
Wheat Screenings	135	.....	.....	.....	.....
Wheat Bran	.....	100	.....	160	.....
Shorts	.....	.....	150	.....	.....
Linseed Oil Meal	25	.....	.....	.....	20

C. Supplements to roughage, approximately two-thirds legume and one-third grass or cereal:

13% PROTEIN (Approx.) MIXTURES

	Table 10 lbs.	Table 11 lbs.	Table 12 lbs.	Table 13 lbs.	Table 14 lbs.	Table 15 lbs.
Oats	900	800	800	700	700	815
Barley	.....	150	100	290	100	150
Wheat	100	.....	100	.....	.....	.....
Wheat Screenings	.....	.....	.....	.....	200	.....
Wheat Bran	.....	50	.....	.....	.....	.....
Shorts	.....	.....	.....	.....	.....	35
Linseed Oil Meal	.....	.....	.....	10	.....	.....

The above mixture schedules A, B and C are designed to meet the needs of dairy farmers who desire to balance their home-grown grains with separate purchased protein concentrates. Supply of especially the high protein feeds, notably linseed meal and meat meal, has been sharply limited for some time and it is not always possible to obtain such in the relatively small amounts which the average farmer requires. Feed manufacturers, however, prepare what are commonly called dairy balancers, or mixed protein concentrates with a fairly uniform content of 32% protein. The following table shows the amount of grain which should be mixed with 100 pounds of a 32% protein concentrate to yield final mixtures of varying protein contents.

Required Protein Content of Final Mix Per Cent	Amount of 32% Protein Supplement Lbs.	Amount of Farm Grains Lbs.
20	100	150
19	100	186
18	100	233
17	100	300
16	100	400
15	100	567
14	100	900
13	100	1900

The question whether grain should be fed to milking cows at pasture cannot be answered definitely. It depends on the level of milk production and on the quality and abundance of pasture. Such experimental data as exist on the question point to the advisability of allowing some grain (ratio 1 lb. grain to 7 lbs. of milk produced per cow) in the case of cows producing upwards of one and one-quarter pounds butterfat (equal to 35 lbs. of 3.5% milk) per day.

Also, it is of economic importance that a high protein concentrate is not required during the pasture season because pasture itself is well balanced, alike with respect to quality and quantity of protein. Barley and oats adequately and most cheaply furnish the supplementary nutrients required at pasture. Failure, or at least sparseness of the permanent pastures, is something to be expected at some time every season and a good husbandman provides for such contingency. The annual pasture crops—oats and the millets—are useful here.

Also, where silage is made, a quantity put up in excess of winter requirements will pay good dividends fed out when pastures fail, or when flies give little peace to graze.

Mineral Requirements

Dairy cattle, more especially the heavier producers, constitute a special problem in mineral nutrition. The demand of such for both lime and phosphorus is hight but difficulty arises from the fact that up to about the beginning of the seventh month of lactation the cow does not readily assimilate these elements from feed. Rather she mobilizes the reserves stored in her skeleton, and if (as frquently happens) through faulty nutrition and management, the reserve has been brought to a low level then disaster is almost certain to follow. It should be the concern of milk producers to ensure in their cows a high skeletal reserve of lime and phosphorus at the beginning of lactation, and this is most certainly accomplished by providing an adequate rest period during which active storage of lime and phosphorus takes place. The rest period (i.e. period between drying-off and recalving) should never be less than eight weeks.

Other essential minerals not provided in sufficient amount by the regular diet are common salt and iodine, and these can be conveniently provided combined as iodized salt.

Animals, given the opportunity, posses remarkable ability to regulate their consumption of these minerals in accordance with their physiological requirements hence, circumstances permitting, the mineral part of the ration is probably best provided "cafeteria" or "self-serve" style. Such in

simple practice resolves itself into placing containers of bone meal or mono-calcium phosphate and iodized salt in pastures and paddocks. The "cafeteria" system of course does not lend itself to the winter close-housing period; then the most practical alternative is to include the mineral supplements (bone meal and powdered iodized salt) in the grain mixture, each at a level of one and one-half per cent. Occasional saltings in mangers may also be given to test for possible salt hunger.

Management

Some of the more important aspects of dairy cattle management are as follows:

1. **Milking:** The experimental work on the mammary gland and milk secretion of recent years has clearly demonstrated the great economic importance of efficient milking. It overshadows in importance every other item of management. Even the potential performance resulting from a skilled breeding and feeding programme may be nulified by improper milking procedure. For information on approved milking techniques the reader is referred to Manitoba Department of Agriculture Publication No. 215.

2. **Breeding and Length of Lactation:** Ideally the lactation (period between calving and going dry) should be of ten months duration, and the recalving interval twelve months. The more persistent milkers, after ten months in milk, still may be yielding ten pounds and upwards daily, but this should not deter the commercial dairymen from enforced "drying off". This is accomplished most quickly and "safely" by sudden and complete cessation of milking. Suspension of milking results in the udder becoming "hard" but as soon as a certain degree of pressure is attained in the gland secretion of milk stops, and that which has accumulated in the udder gradually becomes absorbed. Achieving of the ideal calving intervals demands close observation by the dairyman of the heat periods in order that breeding may take place at the appropriate time. This is especially true during the close-housing winter period, in which, with many cows, the duration of heat is shorter (less than 24 hours) and the indications thereof less marked. The normal gestation period of the cow is 282 days, with a variation of seven days more or less being still regarded as within the physiological limits.

3. **Weed and Feed Flavors in Milk:** Most green forage plants together with silage, turnips, and many weeds are flavor producing, but some much more so than others. Weeds such as stinkweed, wild onion, garlic and mustard, are especially objectionable, and the only remedy is to ensure relative freedom of pastures and fodders from such by the practice of good field husbandry. Forage crops grown for pasture constitute a more serious problem since some of the most useful are strong flavored. Brome—probably the most useful all-round pasture grass—imparts a most objectionable flavor to milk. It is especially troublesome in the early part of the season when growth is rank and the only way to ensure freedom of milk from the taint is to withdraw cows from the pasture about four hours before milking. The same applies to all other flavor-producing feeds. Thus, silage and turnips should always be fed after milking and whatever the circumstances producing the feed flavor, denying cows access to such for the required time before milking would seem to be the only remedy.

4. **Avoidance of "Set-backs to Milk Yield:** Every experienced dairyman knows that checks to milk flow, irrespective of cause, are more or less permanent in the current lactation. There is greater probability of recovery from checks to production when such occur early in the lactation period but, occuring after the third month, the "set-back" is usually permanent because then the maternal impulse to produce milk is on the wane. Checks due to disease processes are, within limits, unforeseen and non-preventable but the toll taken by preventable checks constitutes a considerable drag on the industry.

The most conspicuous losses occur in the early fall season when, in order to "save feed", cows in milk are exposed day and night to cold and rain and general "back-humping" weather. This is bad husbandry. There is little recovery in the usual case from resultant decline in milk yields and the loss involved far more than counter balances any saving in feed and labor. Sudden and prolonged exposure of cows in milk to low temperature is something to be avoided at almost any cost.

Checks to milk production are more the rule than the exception in July and early August, arising from the combination of sparse pastures and insect anoyance. Resultant losses, while perhaps not wholly preventable, can be greatly minimized by annual provision of some temporary pasture such as oats or millet. Silage produced in excess of winter requirements is also very useful in maintaining milk flow during the mid summer period. Judicious use of the newer insect sprays will very effectively control the fly menace.

5. **Stable Management and Cow Comfort:** It is common knowledge that cows generally give their best performance during the early part of summer and duplication in winter of the conditions then obtaining is good, common sense husbandry. These conditions are:

(a) An abundance of palatable and nutritionally well-balanced food.

(b) Comfort. Cows can graze in peace, and lie down at will in comfort.

(c) Suitable air temperature.

These may be considered the ideal conditions making for highest production. They cannot be exactly duplicated during the housing period but it is quite certain the more nearly duplication is achieved the better will be milking performance. Discomfort of cows during barn confinement arises chiefly from shortness of stalls or platforms and damp, vitiated atmosphere. Stalls which are too short involve the cramped position when standing, overhang, with possible injury of rear udder, into the gutter, and brisket and knee manger bruises. Liberal use of bedding makes for warmth, comfort, cleanliness and freedom from hock and udder abrasions.

An efficient system of barn ventilation is conducive to health and comfort of cows, and efficiency involves elimination of foul air and freedom from moisture condensation. Regular grooming and control of lice also greatly promote comfort as well as being important factors in the production of good quality milk.

All animals (including man) respond favorably in one way or another to gentle treatment but with no class of farm animals is the response to loudness and abusiveness more quickly apparent than with milk cows. Quietness and gentleness should continuously prevail in dairy barns.